

United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine

HOSTS OF THE CITRUS BLACKFLY IN MEXICO^{1/}

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The citrus blackfly (Aleurocanthus woglumi Ashby), one of the most serious pests of citrus, is not yet known to be in the United States. In Mexico it is now distributed along the west coast from the Guaymas area in the north to Acapulco in the south. It has spread widely in the south-central part of Mexico and is well established in the Valles area of the State of San Luis Potosi. Isolated outbreaks have been found in the States of Veracruz and Tamaulipas, and recently it has been reported in Nuevo Leon, only 125 miles from the citrus-growing area of Texas.

Obviously it is important to know the plants the citrus blackfly attacks and their relative importance in blackfly dissemination and control. It is equally important to know the parts of the plants that the blackfly attacks, since some parts, such as the fruit, may be widely distributed in commerce. Opportunity, therefore, has been taken to observe any fruit present on infested plants to determine if such fruit might serve for development of the blackfly. Up to the present oviposition has been observed only on sweet oranges but development of the larval stages has not been found. Moreover, the blackfly has not been recorded as ovipositing on fruit other than citrus. Development of the immature stages has been found only on the under sides of leaves and when these surfaces are highly pubescent oviposition seems to be inhibited.

Dietz and Zetek (2) compiled a list of 63 host plants of this insect in 1920 with many from the Canal Zone and the Republic of Panama. This was supplemented by Zetek in 1931 who increased the number to 128 (unpublished report). Investigators of the Secretaría de Agricultura y Ganadería of Mexico (4) and Delgado de G. (1) have reported 10 plants in addition to the 145 species in 59 families found infested by the writer in his studies and by other members of this Bureau in Mexico during

1/ M. Martínez of the Herbario Nacional de México, Instituto de Biología, F. Miranda of the same institute and the Instituto Politécnico Nacional, and Dorothy Parker of Estudios Especiales, Secretaría de Agricultura y Ganadería, determined many of the plants listed herein.

the past 3 years. These 145 were observed in gardens, orchards, and wild growth in the States of Morelos, Sinaloa, San Luis Potosi, and Colima, and include many previously listed. Undoubtedly, many more species will be added to these lists in the future.

Tables 1 and 2 list 75 species in 38 families in Mexico on which the blackfly was found to develop from egg to adult. Table 1 lists the heavily infested plants, which are divided into groups A and B. Group A includes 13 preferred hosts, all Rutaceae, on which infestation is usually heavy. In fact, infestation is usually so heavy that growth, blossoming, and fruiting are seriously inhibited. Group B includes 9 species in 6 families other than Rutaceae that are frequently observed to be heavily infested. It is not known whether the citrus blackfly could continue to live on these plants indefinitely should the population on the plants in Group A be eliminated or controlled. Citrus (group A) and mango (group B) were considered preferred hosts in Key West, Fla., and both were sprayed throughout the successful eradication campaign there (Newell and Brown (3)). Table 2 includes 53 species and 35 families occasionally found infested, and the citrus blackfly can complete its life cycle on them. Ordinarily, the infestation of these plants would not be important.

Table 3 presents a list of 56 plants in 31 families on which the citrus blackfly has not been observed to complete its life cycle. Infestation of several of these plants was observed only recently, and subsequent observation may show completion of the life cycle. This is probable insofar as some are included in families having species on which complete development has already been observed.

In order not to overlook the possibility that there may be plants growing wild near the southern part of the United States which might become infested by the citrus blackfly, should it spread that far north, 33 species of wild plants from Santa Engracia, Tamaulipas, in northeastern Mexico, were transplanted and held in a garden in Cuernavaca, Morelos, to determine their susceptibility to infestation. Eleven of the plants became infested. Only 2 of the families represented had not previously been reported infested, i.e., Cataceae and Ulmaceae (table 4). Although the infestation of these plants was light, on several plants the insects had developed to the last larval or the pupal stage. How heavily these plants might have become infested in their natural habitat is not known, but the information gained would suggest that several wild plants in northeastern Mexico may be capable of propagating the blackfly. The tree Sargentia greggii, a wild species of Rutaceae, is found growing all the way from southwestern Tamaulipas to southern Texas, and wild Diespyros spp., as well as several species of Bumelia (Sapotaceae) are not uncommon in northeastern Mexico.

Twenty-one species of potted ornamental plants from Mexico City, several originally from the United States, were also moved to Cuernavaca. Four plants became infested (table 4). Eudynmus sp.

Ten plants and two families not given in tables 1, 2, 3, and 4, are shown in table 5. With the exception of laurel, these were first reported by Delgado de G. (1) and by the Secretaría de Agricultura y Ganadería (4). Nothing further is known about the status of these plants as hosts.

SUMMARY

The citrus blackfly (Aleurocanthus woglumi Ashby) is well established in Mexico on the west coast, in the south-central part, and in eastern San Luis Potosí, and is reported north of that place within 125 miles of the citrus-growing area of Texas. Immature forms of the blackfly have been found on 155 species of plants representing 61 families in Mexico. Development from egg to adult was observed on 74 species of plants in 38 of the families. Some plants held at Cuernavaca, Morelos, for observation have become infested.

Literature Cited

(1) Delgado de G., Alfonso
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(2) Dietz, H. F., and Zetek, J.
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(3) Newell, W., and Brown, A. C.
1939. Eradication of the citrus blackfly in Key West, Fla.
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(4) Secretaría de Agricultura y Ganadería
1948. "Mosca prieta de los Cítricos" (Aleurocanthus woglumi Ash.), II Convención Nacional de Productores de Cítricos. Feb. 1948, pp. 6-7.

Table 1. --Plants in Mexico found heavily infested by the citrus blackfly and on which complete development has been observed

Family and species	Common names	
	English	Spanish
Rutaceous Plants		
Rutaceae:		
<u>Citrus paradisi</u> Macfad. <u>1, 2/</u>	Grapefruit	Toronjo and pomelo
<u>Citrus grandis</u> (L.) Osbeck	Shaddock	
<u>Citrus aurantium</u> L. <u>1, 2/</u>	Sour orange	Naranjo agrio
<u>Citrus sinensis</u> (L.) Osbeck <u>1, 2/</u>	Sweet orange	Naranjo dulce
<u>Citrus aurantifolia</u> (Christm.) Swingle <u>1, 2/</u>	Lime and sweet lime	Limonero and Limonero dulce
<u>Citrus limon</u> (L.) Burm. f. <u>1, 2/</u>	Lemon	
<u>Citrus medica</u> L. <u>1/</u>	Citron	Cidrero
<u>Citrus nobilis</u> deliciosa (Tenore) Swingle <u>1, 2/</u>	Mandarin and tangerine	Mandarino
<u>Fortunella</u> sp.	Kumquat	Kumquat
<u>Triphasia trifolia</u> (Burm. f.) P. Wilson	Phillipine kumquat (A short-spined trifoliate)	
<u>Atalantia spinosa</u> Tanaka	(A long-spined trifoliate)	
<u>Swinglea glutinosa</u> (Blanco) Merrill	(A large-leaf trifoliate)	
<u>Severinia buxifolia</u> (Poir) Tenore	(Has very short spines and round thick leaves)	
Nonrutaceous Plants		
Anacardiaceae:		
<u>Mangifera indica</u> L. <u>1, 2/</u>	Mango	Mango
Annonaceae:		
<u>Annona cherimola</u> Mill. <u>1, 2/</u>	Cherimoya	Annona
Ebenaceae:		
<u>Diospyros kaki</u> L.	Japanese persimmon	
<u>Diospyros</u> sp.	Persimmon	Nispero
<u>Diospyros ebenaster</u> Retz. <u>2/</u>	Black sapote	Zapote prieto

Table 1. --(Continued)

Family and species	Common names	
	English	Spanish
Nonnutaceous Plants--Continued		
Malaceae:		
<u>Pyrus communis</u> L.	Pear	Peral
<u>Cydonia oblonga</u> Miller	Quince	Membrillo
Myrtaceae:		
<u>Myrtus communis</u> L. ^{3, 4/}	Myrtle	Mirto
Rubiaceae:		
<u>Coffea arabica</u> L. ^{1, 2/}	Coffee	Café

1/ Previously listed by Dietz and Zetek (2).

2/ Previously listed by Delgado de G. (1).

3/ Previously listed by Secretaría de Agricultura y Ganadería (4).

4/ Zetek, J. Unpublished report.

Table 2. --Plants in Mexico occasionally infested by the citrus blackfly
but on which complete development has been observed

Family and species	Common names		Degree of infestation
	English	Spanish	
Amygdalaceae:			
<u>Prunus domestica</u> L.	Plum	Ciruela	Very light
Anacardiaceae:			
<u>Anacardium occidentale</u> L. ^{1/2}	Cashew	Marañon	Light
<u>Spondias mombin</u> L. (S. lutea L.)	Jobo	Ciruela	Light
Apocynaceae:			
<u>Plumeria rubra</u> f. <u>acutifolia</u> (Poir.) Woodson ^{3/}	---	Flor de Mayo	Light
Araceae:			
<u>Monstera deliciosa</u> Liebm.	Monstera	Piñanona	Very light
<u>Philodendron</u> sp.	Philodendron	---	Light
Bignoniaceae:			
<u>Tabebuia pentaphylla</u> (L.) Hemel.	---	Cinco hojas, palo de rosa	Heavy
<u>Parmentiera edulis</u> DC.	---	Huajilote, chote	Light
Burseraceae:			
<u>Bursera simaruba</u> (L.) Sarg.	Gumbolimbo	Chaca, mulato	Light
Buxaceae:			
<u>Buxus sempervirens</u> L.	Box tree	---	Heavy
Cannaceae:			
<u>Canna indica</u> L. ^{3/}	Canna	Platanillo	Very light
Clusiaceae:			
<u>Mammea americana</u> L. ^{3/}	Mammeeapple	Mamey de la tierra	Light
Euphorbiaceae:			
<u>Cnidoscolus urens</u> (L.) Arthur	---	Chaya, mala mujer	Light
<u>Jatropha curcas</u> L.	---	Piñoncillo	Light
<u>Hura polyandra</u> Baill.	Sandbox tree	Haba de San Ignacio	Light
<u>Sapium macrocarpum</u> Muell. Arg.	---	Lechon	Very light
Lauraceae:			
<u>Persea americana</u> Mill. ^{1/}	Avocado	Aguacata	Very light
Leguminosae:			
<u>Myroxylon balsanum</u> var. <u>pereirae</u> (Royle) Harms	Perubalsam	Mata de rata	Light

Table 2. --(Continued)

Family and species	Common names		Degree of infestation
	English	Spanish	
Loranthaceae (?)	An epiphyte		Moderate
Lythraceae:			
<u>Lagerstroemia indica</u> L. ^{1/}	Crapemyrtle	Astronomica	Moderate
Magnoliaceae:			
<u>Magnolia soulangeana</u> Soul.	---	---	Moderate
Malaceae:			
<u>Crataegus</u> sp.	Haw	Tejocote	Light
Malpighiaceae:			
<u>Byrsonima crassifolia</u> (L.) DC.	---	Nanche	Very light
Malvaceae:			
<u>Hibiscus</u> spp. ^{1/}	Hibiscus	Tulipan	Moderate
Meliaceae:			
<u>Melia azedarach</u> L. ^{4/}	Chinaberry	Paraíso	Light
<u>Cedrela</u> sp.	Spanish cedar	Cedro	Moderate
Mimosaceae:			
<u>Inga inicuil</u> Cham. & Schlecht.	---	Jinicuil	Very light
<u>Inga</u> sp.	---	Guaje	Light
Moraceae:			
<u>Artocarpus communis</u> Forst. ^{3/}	Breadfruit	Arbol de pan	Very light
Musaceae:			
<u>Musa</u> spp. ^{1, 2/}	Banana	Plátano	Light
<u>Strelitzia</u> sp.	Bird-of-paradise-flower	Ave de paraíso	Light
Myrsinaceae:			
<u>Ardisia compressa</u> H. B. K.	---	Chiquis	Light
Myrtaceae:			
<u>Psidium sartorianum</u> (Berg) Niedenzu ^{2/}	---	Arrayan	Moderate
<u>Psidium cattleianum</u> Sabine	Cattley guava	Guayaba de mesta	Light
<u>Eugenia jambos</u> L. ^{1, 2/}	Roseapple	Pomarosa	Light
Oleaceae:			
<u>Fraxinus</u> sp. ^{4/}	Ash	Fresno	Moderate

Table 2. --(Continued)

Family and species	Common names		Degree of infestation
	English	Spanish	
Phoenicaceae:			
<u><i>Washingtonia robusta</i></u> Wendl.	Washington	Palma de	Light
= <u><i>Cryosophila nana</i></u> (H. B. K.) Blume	palm	Castilla	
<u><i>Acanthorrhiza mocinii</i></u> (H. B. K.) Benth. & Hook.	---	Palma de abanico	Very light
Punicaceae:			
<u><i>Punica granatum</i></u> L. ^{1/}	Pomegranate	Granada	Moderate
Rubiaceae:			
<u><i>Bouvardia multiflora</i></u> (Cav.) Schult.	---	Plúmbago rojo	Heavy
Salicaceae:			
<u><i>Populus</i></u> sp.	Poplar	Chopo	Moderate
Sapindaceae:			
<u><i>Sapindus mukorossi</i></u> Gaertn.	Soapberry	Jabonillo	Light
<u><i>Cardiospermum</i></u> sp.	---	Farolitos	Light
Sapotaceae:			
<u><i>Lucuma salicifolia</i></u> H. B. K. ^{2/3/}	Yellow sapote	Zapote amarillo	Light
<u><i>Achras zapota</i></u> L. ^{1/2/}	Sapodilla	Chico zapote	Moderate
<u><i>Calocarpum mammosum</i></u> (L.) Pierre ^{1/2/}	Sapote	Zapote mamey	Moderate
<u><i>Bumelia laetevirens</i></u> Hemsl.	---	Tilapa, coma real	Moderate
Solanaceae:			
<u><i>Cestrum nocturnum</i></u> L. ^{1/}	Nightblooming jes-samine	Huele de noche	Very light
<u><i>Capsicum frutescens conoides</i></u> (Mill.) Bailey	Chili pepper	Chile	Moderate
<u><i>Solandra guttata</i></u> Don.	Chalicevine	Copa de oro	Light
Verbenaceae:			
<u><i>Duranta repens</i></u> L. ^{3/}	---	Pinguica	Light
Vitaceae:			
<u><i>Vitis</i></u> sp. ^{3/}	Grape	Uva	Moderate
Zingiberaceae:			
<u><i>Zingiber clarkii</i></u> King	Ginger	Jenibre	Very light

^{1/} Previously listed by Dietz and Zetek (2).^{2/} Previously listed by Delgado de G. (1).^{3/} Zetek, J. Unpublished report.^{3/} Previously listed by Secretaría de Agricultura y Ganadería (4).

Table 3. -- Plants in Mexico on which development of the citrus blackfly has not been found to be complete

Family and species	Common names		Stage attained $\frac{1}{4}$	Degree of infestation
	English	Spanish		
Acanthaceae:				
<i>Dicliptera</i> aff. <i>aquatica</i> Leonard	---	---	Egg	Very light
<i>Thunbergia fragrans</i> Roxb.	---	---	First	Light
<i>Thunbergia laurifolia</i> Lindl.	---	Francesa	First	Very light
Alliaceae:				
<i>Bougainvillea spectabilis</i> Willd. 2, 3	Bougainvillea	Bugambilia	First	Light
Amygdalaceae:				
<i>Prunus armeniaca</i> L.	Apricot	Chabacano	First	Light
<i>Prunus persica</i> (L.) Stokes	Peach	Durazno	Pupal	Very light
<i>Prunus capuli</i> Cav.	---	Capulin	First	Very light
Annonaceae:				
<i>Annona muricata</i> L. 4	Soursop	Guanábana	Third	Light
Apocynaceae:				
<i>Tabernaemontana alba</i> Mill.	---	Cohon de gato	First	Light
<i>Trachelospermum jasminoides</i> (Lindl.) Lem. 5	Star jasmin	---	First	Light
<i>Allamanda cathartica</i> L.	Allamanda	Allamanda	First	Light
<i>Carissa grandiflora</i> A. DC.	Natal plum	---	Egg	Light
Araceae:				
<i>Xanthosoma</i> sp.	---	Mano de leon	First	Very light
Asclepiadaceae:				
<i>Gonolobus</i> sp.	---	Cagueyote	First	Light
<i>Asclepias curassavica</i> L.	---	Soldadillo	Pupal	Moderate
<i>Asclepias</i> sp.	---	---	First	Very light

Table 3. --(Continued)

Family and species	Common names			Infestation		
	English	Spanish	Stage attained $\frac{L}{U}$	Degree		
Bignoniaceae: <u>Pyrostegia venusta</u> Baill.	---	Llamarada	First	Light		
Bixaceae: <u>Bixa orellana</u> L.	Arnotto tree	Achiote	First	Very light		
Caesalpiniaceae: <u>Cassia occidentalis</u> L.	---	Jasmin amarillo	First	Very light		
	---	Pata de vaca	First	Light		
Bauhinia sp.						
Caricaceae: <u>Carica papaya</u> L. $\frac{4}{5}$	Papaya	Papaya	First	Very light		
Cucurbitaceae: <u>Pittiera grandiflora</u> Cogn.	---	Xtabentun	Egg	Very light		
	---	Pepinillo	Egg	Very light		
<u>Momordica charantia</u> L.						
Flacourtiaceae: <u>Xylosma</u> sp.	---	Abrojo	Pupal	Moderate		
	---	Espina blanca	First	Light		
<u>Casearia aculeata</u> Jacq.						
Geraniaceae: <u>Pelargonium</u> sp.	Geranium	Geranio	Egg	Light		
Juglandaceae: <u>Carya</u> sp.	Pecan	Pacana	Pupal	Light		
Lauraceae: <u>Persea</u> sp.	---	Aguacatillo	First	Very light		
Leguminosae: <u>Canavalia ensiformis</u> (L.) DC.	Jackbean	---	Egg	Very light		
<u>Eysenhardtia</u> sp.	---	Palo dulce	Egg	Very light		

Table 3. --(Continued)

Family and species	Common names		Infestation	
	English	Spanish	Stage attained 1/	Degree
Loganiaceae: <i>Gelsemium sempervirens</i> (L.) Ait.	Yellow jessamine	---	First	Light
Mimosaceae:				
<i>Pithecellobium lanceolatum</i> (Humb. & Bonpl.) Benth.	---	Ogador	First	Light
<i>Pithecellobium dulce</i> (Roxb.) Benth.	---	Guamúchil	First	Very light
Acacia sp.	---	Gavia	Egg	Light
Moraceae: <i>Ficus</i> sp.	Wild fig	Xopoy	Pupal	Light
Myrsinaceae: <i>Parathesis serrulata</i> (Swartz) Mez.	Ardisia	Ardisia	First	Heavy
Myrtaceae:				
<i>Psidium guajava</i> L. 4/5/ <i>Eugenia uniflora</i> L. 2/	Guava Surinam cherry	Guayaba ---	Pupal Egg	Very light Light
Oleaceae:				
<i>Jasminum sambac</i> Sol.	---	---	Second	Very light
<i>Jasminum humile</i> L.	---	---	First	Very light
<i>Ligustrum</i> sp.	Privet	Trueno	Egg	Very light
Opiliaceae:				
<i>Agonandra racemosa</i> (DC.) Standl.	---	---	First	Moderate

Table 3. --(Continued)

Family and species	Common names		Stage attained 1/	Degree of infestation
	English	Spanish		
Passifloraceae:				
<i>Passiflora</i> sp.	---		Pasionaria	Moderate
Piperaceae:				
<i>Piper</i> sp. 2	---		Cordoncillo	First
Polygonaceae:				
<i>Antigonon leptopus</i> H. & A. 4/	Coral vine			
Rosaceae:				
<i>Rosa</i> sp. 2	Rose		Coniacata	Second
<i>Pyracantha</i> sp.	Pyracantha			Light
Rutaceae:				
<i>Murraya paniculata</i> (L.)	Orange-jessamine			
<i>Jack</i> 5/				
<i>Casimiroa edulis</i> Llave &	White sapote			
<i>Lex</i> 2/				
<i>Microcitrus virgata</i> Hort.				
(Hybrid-cutting)				
Salicaceae:				
<i>Salix</i> sp.	Willow			
Sapindaceae:				
<i>Sapindus saponaria</i> L.	Wild soapberry			
	Jaboncillo			

Table 3. -(Continued)

Family and species	Common names			Infestation	
	English		Spanish	Stage attained 1/	Degree
Undetermined:	---	Orcajuda Manzanillo Cuajiniquil Clavel de las Indias		Egg Egg First Egg	Light Light Very light Light

1/ First, second, and third represent larval instars.

2/ Zetek, J. Unpublished report.

3/ Previously listed by Secretaría de Agricultura y Ganadería (4).

4/ Previously listed by Dietz and Zetek (2).

5/ Previously listed by Delgado de G. (1).

Table 4. - Plants transported to Cuarnavaca, Morelos, for observation to determine their susceptibility to infestation

Family and species	Common names		Infestation	
	English	Spanish	Stage attained 1/	Degree
Wild Plants From Santa Engracia, Tamaulipas				
Annonaceae <i>Jiruena</i> sp.	---	Cherimoya	Egg	Light
Cactaceae <i>Pepexia tampicana</i> Web.	Tampico pereskia	Tampiqueña	Egg	Very light
Ebenaceae <i>Diospyros</i> sp.	---	Chapote manzano	Pupal	Very light
Flacourtiaceae <i>Xylosma</i> sp.	---	Granadillo	First	Moderate
Malpighiaceae <i>Malpighia glabra</i> L. 2/	Barbados cherry	---	Third	Very light
Opiliaceae <i>Aganandra obtusifolia</i> Standl.	---	Revienta cabra	Egg	Very light
Pithecellobiaceae <i>Piper hispanicum</i> S. Wats.	---	Cocolmeca	Egg	Very light
Rutaceae <i>Sargentia tigrina</i> S. Wats.	Yellow chapote	Chapote amarillo	Pupal 3/	Light
Sapindaceae <i>Unneda</i> sp.	---	Monillo	First	Very light
Sebastodes <i>Sapindus saponaria</i> L.	Soapberry	Jaboncillo	Pupal	Very light
Ulmaceae <i>Celtis</i> sp.	---	Granjeno huasteco	Third	Very light

Table 4. --(Continued)

Family and species	Common names		Infestation	
	English	Spanish		
Ornamental Plants From Mexico City				
Celastraceae:				
<u>Euonymus</u> sp.	Euonymus	---	Egg	Light
Hypericaceae:				
<u>Hypericum henryi</u> Léveillé & Vaniot	Hypericum	---	Second	Light
Oleaceae:				
<u>Ligustrum</u> sp.	Waxleaf privet	---	Egg	Light
Pittosporaceae:				
<u>Pittosporum undulatum</u> Vent.	Pittosporum	---	Egg	Light

1/ First, second, and third represent larval instars.

2/ Previously listed by Dietz and Zetek (2).

3/ Parasites (Eretmocerus serius Silv.) had emerged from two pupae.

Table 5. — Plants not listed heretofore in this paper that were found by the Mexican Department of Agriculture to be infested by the citrus blackfly

Family and species	Common names	
	English	Spanish
Asclepiadaceae:		
<u>Cryptostegia grandiflora</u> (Roxb.) R. Br. ^{1/}	Rubbervine	Clavel de España
Caesalpiniaceae:		
<u>Caesalpinia pulcherrima</u> (L.) Swartz ^{1/}	Barbados flower	Tabachín
Lauraceae:		
<u>Laurus nobilis</u> L. ^{1, 2/}	Laurel	Laurel
Malaceae:		
<u>Malus</u> sp. ^{3/}	Wild apple	Manzano silvestre
Malvaceae:		
<u>Gossypium</u> sp. ^{3/}	Wild cotton	Algodon silvestre
Myrtaceae:		
<u>Eucalyptus globulus</u> Labill. ^{3/}	Eucalyptus	Eucalipto
Phoenicaceae:		
<u>Orbignya</u> (Attalea) <u>cochune</u> (Mart.) Dahlg. ^{1/}	---	Coquito
Sapotaceae:		
<u>Chrysophyllum mexicanum</u> T. S. Brandeg. ^{1/}	Starapple	Caimito
Theaceae (or) Ternstroemiacae:		
<u>Camellia japonica</u> L. ^{3/}	Camellia	Camélia
Zygophyllaceae:		
<u>Guaiacum</u> sp. ^{3/}	---	Guayacán

^{1/} Delgado de G. (1).

^{2/} Previously listed by Díaz and Zetek (2).

^{3/} Secretaría de Agricultura y Ganadería (3).